



# National Transportation Safety Board

Washington, D.C. 20594  
Safety Recommendation

10/24 19/66

**Date:** August 3, 1987

**In reply refer to:** A-87-102

Honorable T. Allan McArtor  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

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On June 24, 1986, occupants aboard a Boeing 747-122, N4718U, operated by United Air Lines, Inc., (United) were exposed to an irritating toxic substance that produced various degrees of discomfort during a flight from Chicago, Illinois, to Honolulu, Hawaii. 1/ Symptoms reported during the flight by 100 of the 421 passengers, by 10 of the 12 flight attendants, and by the flight's second officer included headaches, eye irritation, dizziness, nausea, and nasal congestion. The airplane's cargo was inspected upon arrival in Honolulu and nothing unusual was found. The airplane was inspected and no mechanical problems were identified.

Doctors who examined the flight attendants reported that they had been exposed to some toxic gas, but they were unable to establish which gas or gases had caused the symptoms. The doctors did report that one possible cabin air contaminant capable of producing these symptoms was atmospheric ozone.

According to 14 CFR 121.578, air carriers cannot operate flights above specified altitudes if the cabin ozone concentrations exceed specified levels as a function of altitude and flight time. Air carriers may demonstrate that they will not exceed these limits by means of a one-time demonstration of their ozone control equipment. The Federal Aviation Administration (FAA) principal airworthiness inspector for United reported to the Safety Board that the airline was using (and continues to use) catalytic converters in its airplanes to control the ozone. The inspector also stated that while the converters are required to function properly, there is no regular schedule for their replacement, nor is there a scheduled inspection because the converters are subject to condition monitoring. According to the inspector, this means that the equipment may be used until occupants in the cabin complain about the quality of the air. FAA and airline personnel could offer no guidelines regarding the minimum acceptable level of effectiveness for the operation of these converters. According to United, these catalytic converters may be kept in service indefinitely.

Testing of the three catalytic converters from N4718U showed that these converters were operating at only 65, 45, and 43 percent efficiency. Although crew and passenger discomfort on N4718U did not lead to an accident, and ozone exposure was not positively proven as the cause for the symptoms, the incident illustrates an unusual situation: that is, the equipment for control of ozone exposure may be operated, without inspection or efficiency testing, until its performance becomes so degraded that flight in areas of high

1/ NTSB accident LAX MA 275 (File number 5047).

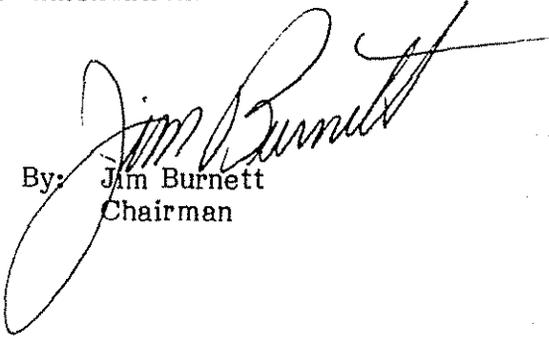
ozone concentrations results in noxious ozone levels in the airplane cabin. In effect, illness or widespread discomfort of passengers and crew becomes the condition for replacement of the equipment. Further, the potential for high ozone concentrations to produce illness in crewmembers might lead to a disability that could cause an accident.

Maintenance or replacement of safety-related equipment is usually required on a regular schedule based on the equipment's discrete life-limits, or such equipment is subject to performance monitoring for acceptable functioning. Ozone control equipment represents an exception to this standard.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Establish a requirement for periodic inspection or replacement of cabin ozone control equipment used to meet the ozone concentration limit provisions of 14 CFR 121.578 as necessary to verify continued compliance with those provisions. (Class II, Priority Action) (A-87-102)

BURNETT, Chairman, GOLDMAN, Vice Chairman, and LAUBER, NALL, and KOLSTAD, Members, concurred in this recommendation.

  
By: Jim Burnett  
Chairman



Brief of Incident (Continued)

File No. - 5047      6/24/86      PACIFIC OCEAN      A/C Reg. No. N4718U      Time (Lcl) - 1200 PST

Occurrence      MISCELLANEOUS/OTHER  
Phase of Operation      CRUISE - NORMAL

Findings(s)

1. UNDETERMINED
2. AIR COND/HEATING/PRESSURIZATION - BLOCKED(PARTIAL)
3. FUSELAGE/CABIN - OTHER
4. PHYSICAL IMPAIRMENT(OTHER ORGANIC PROBLEM) - OTHER PERSONNEL

-----Probable Cause-----

The National Transportation Safety Board determines that the Probable Cause(s) of this incident is/are findings(s) 1,3

Factor(s) relating to this incident is/are findings(s) 2